

Self-Referral and Its Effect on Use of Imaging

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Frequency of imaging per episode of illness

Clinical presentation	Ratio of imaging frequency, self-referrers/radiologist-referrers
Chest pain	1.9
CHF	2.7
Difficulty urinating	2.2
GI bleeding	1.7
Headache	4.3
Knee pain	7.7
Low back pain	3.6
Transient cerebral ischemia	4.7
URI	2.3
UTI	2.4

***Hillman et al, JAMA 1992; 268: 2050**

U.S. GAO Report, “Referrals to Physician-Owned Imaging Facilities Warrant HCFA’s Scrutiny”, 10/94

- Compared rates of imaging for MDs having in-practice imaging equipt with rates for other MDs who referred elsewhere.
- Based on Medicare claims covering 19.4 million office visits & 3.5 million imaging studies in FL during 1990.
- Ratios of imaging rates, self-referrers/outside referrers:

MRI	3.06
CT	1.95
US	5.13
Nuc Med	4.52
X-ray	2.10

Imaging Utilization: Same-Specialty-Referral Group vs. Radiologist-Referral Group -- likelihood of imaging

Table 4

Results of Logistic Regression Analysis of Likelihood of Imaging

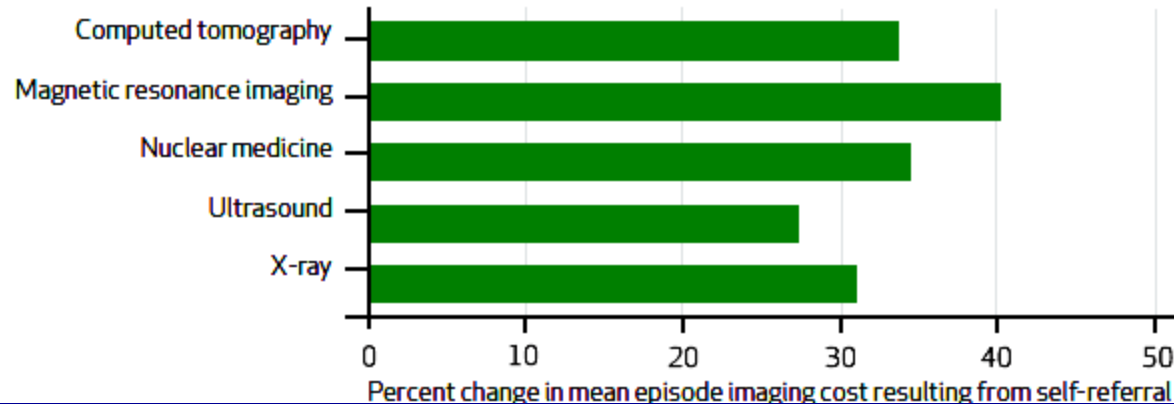
Condition	Imaging Procedure	Odds Ratio*	P Value
Cardiopulmonary disease	Chest radiography	3.228 (3.201, 3.255)	<.001
Cardiac and/or coronary disease	Nuclear medicine	3.004 (2.962, 3.048)	<.001
Extremity fracture	Radiography	2.753 (2.659, 2.850)	<.001
Knee pain	Radiography	2.092 (2.056, 2.129)	<.001
Knee pain	MR imaging	1.913 (1.840, 1.990)	<.001
Abdominal malignancy	CT	1.494 (1.375, 1.623)	<.001
Stroke	CT	1.260 (1.127, 1.409)	<.001
Stroke	MR imaging	1.196 (1.012, 1.413)	.036

* Odds ratios are for SAME versus RAD, controlling for patient age and comorbidity score. Data in parentheses are 95% confidence intervals.

Effects of Self-Referral on Costs

EXHIBIT 4

Average Effect Of Self-Referral For Imaging On Mean Episode Imaging Cost

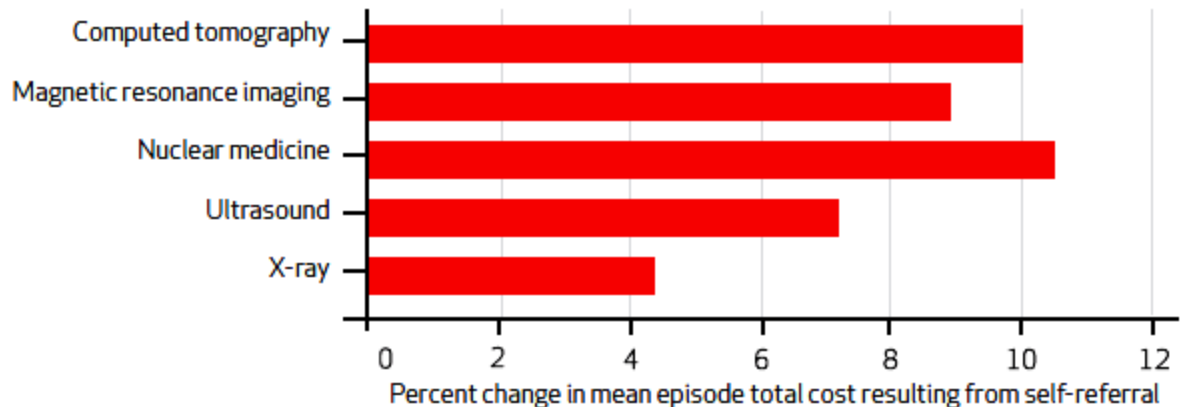


data from Medicare
5% Research
Identifiable Files, 04-07

from evaluation of 733,459
Medicare episodes of care,
grouped into 20 combos of
a clinical problem + an
imaging technique

EXHIBIT 3

Average Effect Of Self-Referral For Imaging On Mean Episode Total Cost



Doctors Reap Benefits By Doing Own Tests

By [Shankar Vedantam](#)

Washington Post Staff Writer

Friday, July 31, 2009

In August 2005, doctors at Urological Associates, a medical practice on the Iowa-Illinois border, ordered nine CT scans for patients covered by Wellmark Blue Cross and Blue Shield insurance. In September that year, they ordered eight. But then the numbers rose steeply. The urologists ordered 35 scans in October, 41 in November and 55 in December. Within seven months, they were ordering scans at a rate that had climbed more than 700 percent.

The increase came in the months after the urologists bought their own CT scanner, according to documents obtained by The Washington Post. Instead of referring patients to radiologists, the doctors started conducting their own imaging -- and drawing insurance reimbursements for each of those patients.

PHOTOS 



Lawmakers -- including Reps. Anthony Rogers (R-Mich.) and Janice Schakowsky (D-Mich.) -- are working out details of health-care legislation that would prohibit doctors from profiting from their own tests. (Linda Davidson - The Washington Post)

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Washington Post
7/31/09

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REPORT TO THE CONGRESS

Improving Incentives in the Medicare Program

MEDPAC Medicare
Payment Advisory
Commission

MedPAC report to the Congress, June 2009:
contained a chapt titled
“Impact of Physician
Self-Referral on Use of
Imaging Services Within
an Episode”

Studied 493,000
episodes of care,
comparing use of
imaging among MDs
who self-referred &
those who instead
referred to hospitals or
imaging centers

MedPAC Report to the Congress, June 2009

- All episodes showed higher imaging use with self-referral; those pts were up to 2.3X as likely to receive at least 1 imaging study during the episode.
- Episodes with a self-referring MD had 5-104% higher imaging spending than those with a non-self-referring MD.
- Example: 14% of all migraine episodes with self-referring MDs had MRI vs 8% with non-self-referring MDs. Migraine episodes with self-referring MDs had 85% more spending on MRI.



United States Government Accountability Office

Report to Congressional Requesters

September 2012

MEDICARE

Higher Use of
Advanced Imaging
Services by Providers
Who Self-Refer
Costing Medicare
Millions

Oct 2012 GAO Report on Self-Referral for MRI & CT in Private Offices & IDTFs

- **2004 to 2010:** self-referred MRI grew by 84% vs 12% for non-self-referred MRI.
- Self-referred CT grew by 107% vs 31% for non-self-referred CT.
- **In 2010:** self-referrers averaged 36.4 MRI referrals vs 14.4 for non-self-referrers.
- Self-referrers averaged 73.2 CT referrals vs 32.3 for non-self-referrers.

Only a Small % of Pts Having High Tech Imaging Have Had Office Visits the Same Day

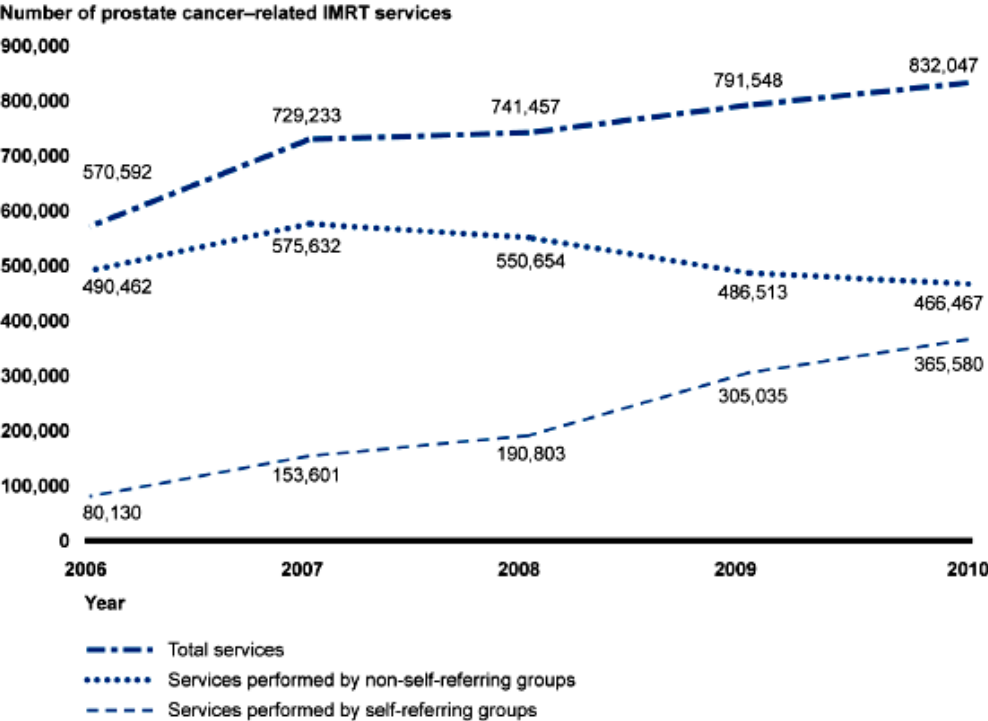
EXHIBIT 1

Types Of Self-Referred Imaging And Same-Day Office Visits, 2007

Type of imaging	BETOS codes	Number of self-referred images	Percent of all self-referred images	Number with same-day office visit	Percent with same-day office visit
Most straightforward x-rays	I1A, I1B	621,300	28.2	459,015	73.9
Chest x-rays	I1A	148,076	6.7	117,113	79.1
Musculoskeletal x-rays	I1B	473,224	21.5	341,902	72.2
Other x-rays	I1C, I1D, I1F	37,649	1.7	14,681	39.0
High-tech imaging	I1E, I2	1,079,739	49.0	163,744	15.2
Nuclear medicine	I1E	1,034,426	47.0	153,556	14.8
CT	I2A, I2B	29,241	1.3	7,797	26.7
MRI	I2C, I2D	16,072	0.7	2,391	14.9
Ultrasound	I3	434,159	19.7	149,689	34.5
Abdomen/pelvic	I3B	39,047	1.8	21,836	55.9
Echocardiography	I3C	246,911	11.2	83,878	34.0
Other	I3A-F	148,201	6.7	43,975	29.7
Procedural imaging	I4	29,765	1.4	7,222	24.3
All except most straightforward x-rays	All except I1A, I1B	1,581,312	71.8	335,336	21.2

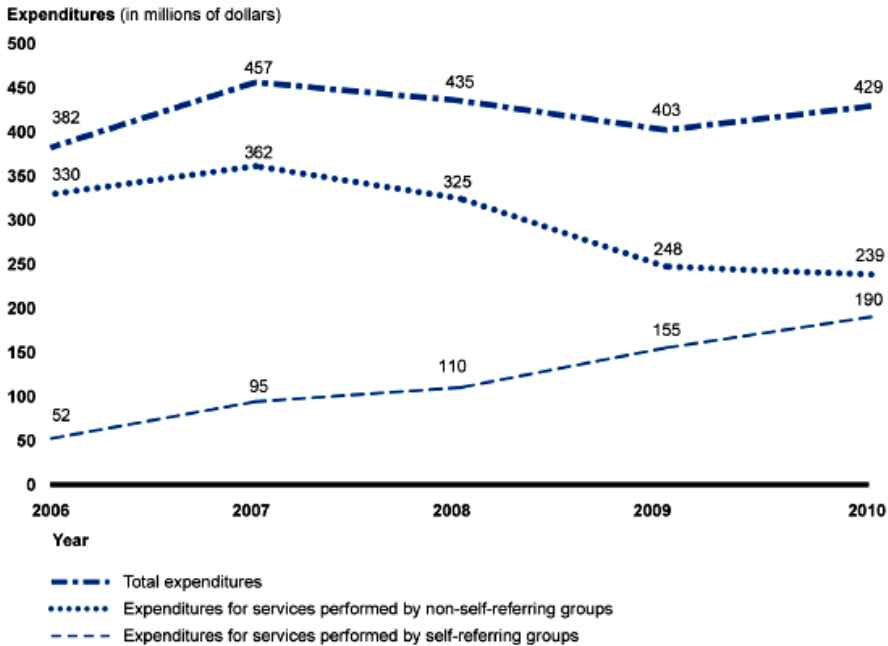
SOURCE Authors' analysis of Medicare's 2007 Research Identifiable Files. **NOTES** Figures represent only global and technical component-only claims, as explained in the text. BETOS codes are Berenson-Eggers Type of Service codes, used by the Centers for Medicare and Medicaid Services to classify procedures. CT is computed tomography. MRI is magnetic resonance imaging.

Figure 1: Number of Medicare Prostate Cancer–Related IMRT Services Performed by Self-Referring and Non-Self-Referring Groups in Physician Offices, 2006-2010



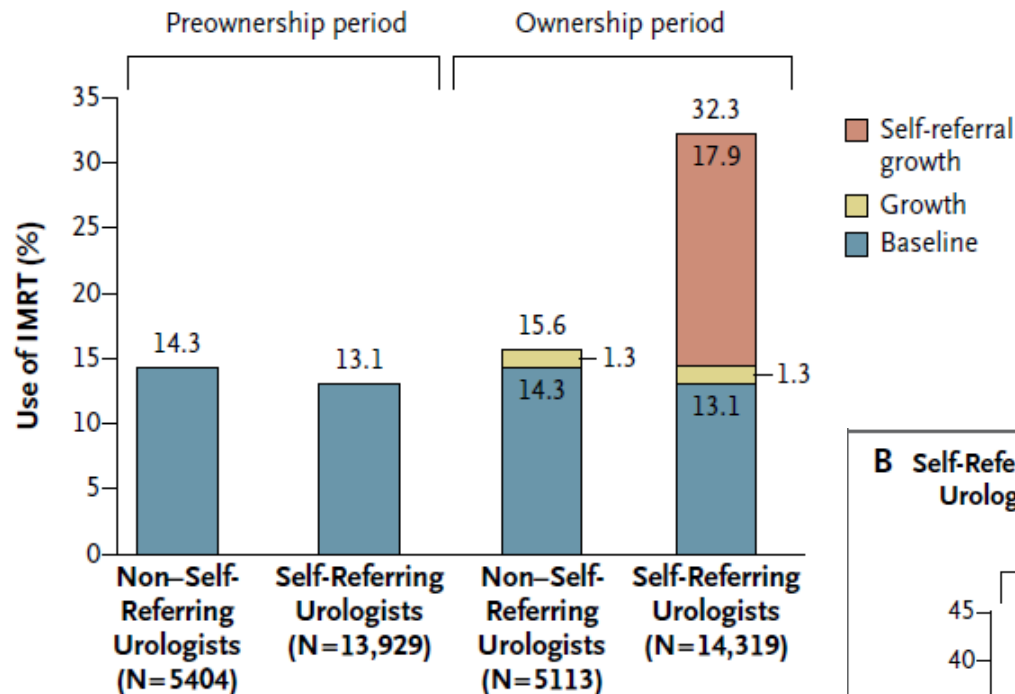
Effect of self-referral on use of IMRT in Medicare prostate cancer pts

Figure 3: Changes in Medicare Prostate Cancer–Related IMRT Expenditures for Services Performed by Self-Referring and Non-Self-Referring Provider Groups in Physician Offices, 2006-2010



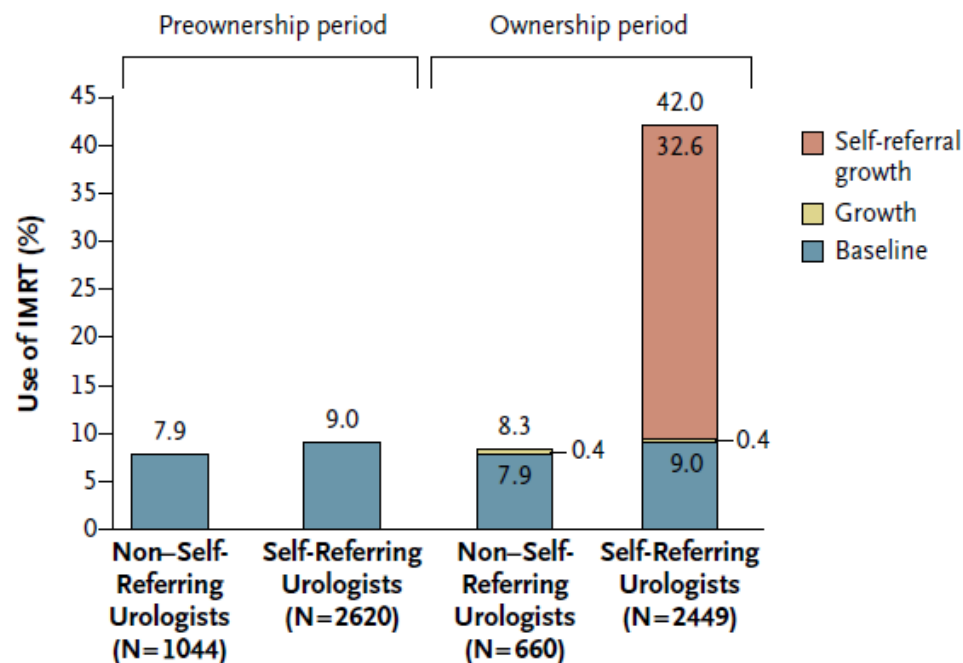
GAO 13-525, issued July 2013:
“Higher Use of Costly Prostate Cancer Treatment by Providers Who Self-Refer Warrants Scrutiny”

A Self-Referring Urologists in Private Practice versus Non-Self-Referring Urologists in Private Practice



Use of IMRT to treat prostate ca by urologists who acquired IMRT and became self-referring vs. urologists who did not self-refer for IMRT. Were 2 separate study groups, each with their own matched control groups.

B Self-Referring Urologists in Private Practice versus Non-Self-Referring Urologists Employed by a National Comprehensive Cancer Network Center



Thank you!

Utilization of extremity x-rays among orthopedists (1784), podiatrists (1425), & rheumatologists (103) in 2001 – NYC fee-for-service HMO

	self-referrers	radiologist-referrers
# of studies	92,979	8047
exams/100 office visits	32	17
frequency of bilateral exams	14%	10%

*** Litt, Radiology 2005; 235: 142**

Effect of Financial Incentives on Test-Ordering in an Ambulatory Care Center

- Examined lab and x-ray ordering habits of 15 MDs in a for-profit ambulatory care center in Boston. Lab & x-ray were on-site.
- Prior to 1985, the MDs were paid a flat salary.
- During 1985, financial incentives were introduced, which allowed MDs to earn bonuses based upon revenues they generated.
- 3 winter months of 1984-85 (before) and 1985-86 (after) were compared.
- 11 of 15 ordered more x-rays in '85-86; overall utilization by the group ↑ by 16%.
- 13 of 15 ordered more lab tests in '85-86; overall utilization by the group ↑ by 23%.

***Hemenway, NEJM 1990; 322: 1059**

Volume of MRIs in Private Offices, by Specialty Owning/Leasing the MRI Units, Medicare 2010

	2010 Medicare volume	% change since 2000
radiologists	1,410,456	+67%
nonradiologist MDs & other providers	502,384	+363%
IDTFs	603,509	+188%

**Levin DC, Rao VM et al, JACR 2008;5:105
(data in paper through 2005)**

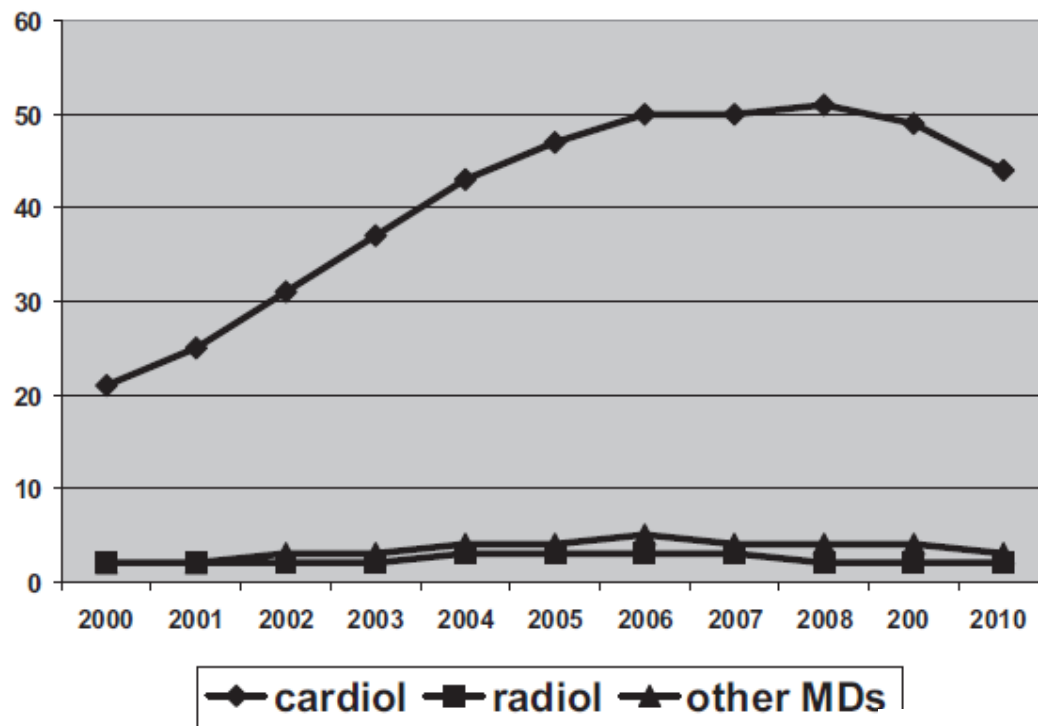
Volume of CTs in Private Offices, by Specialty Owning the CT Units, Medicare 2010

	2010 Medicare volume	% change since 2000
radiologists	1,915,696	+96%
nonradiologist MDs & other providers	946,198	+454%
IDTFs	389,715	+417%

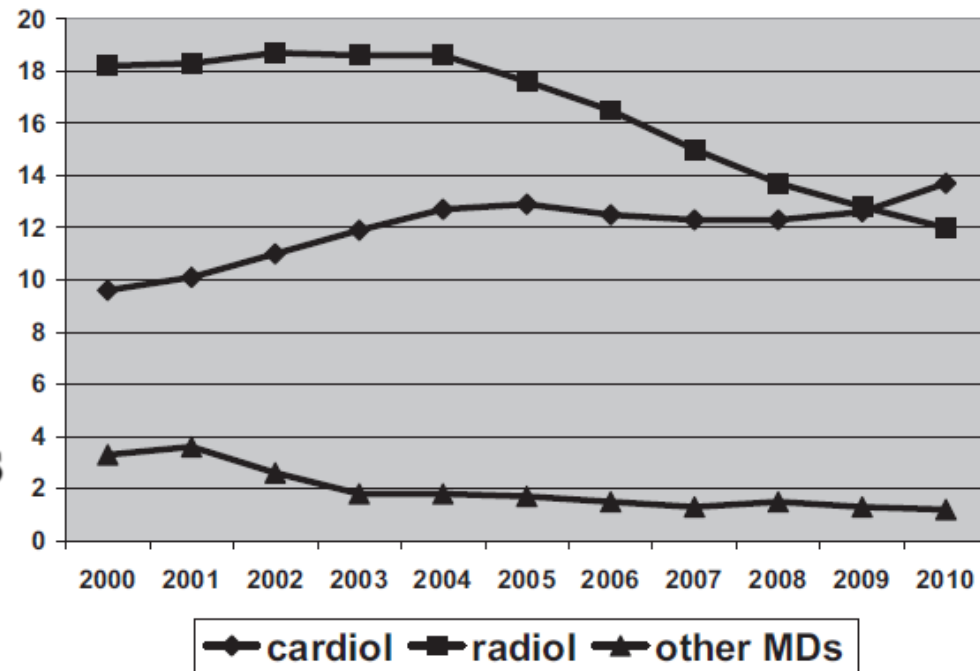
***Levin DC, Rao VM et al, JACR 2008;5:1206
data in paper through 2006**

Radionuclide Myocardial Perfusion Imaging

private offices



hospitals



Effect of MRI ownership on negativity rate of scans: Results from a single radiology group who read for one orthopedic group that self-referred & another group that referred to Duke radiology

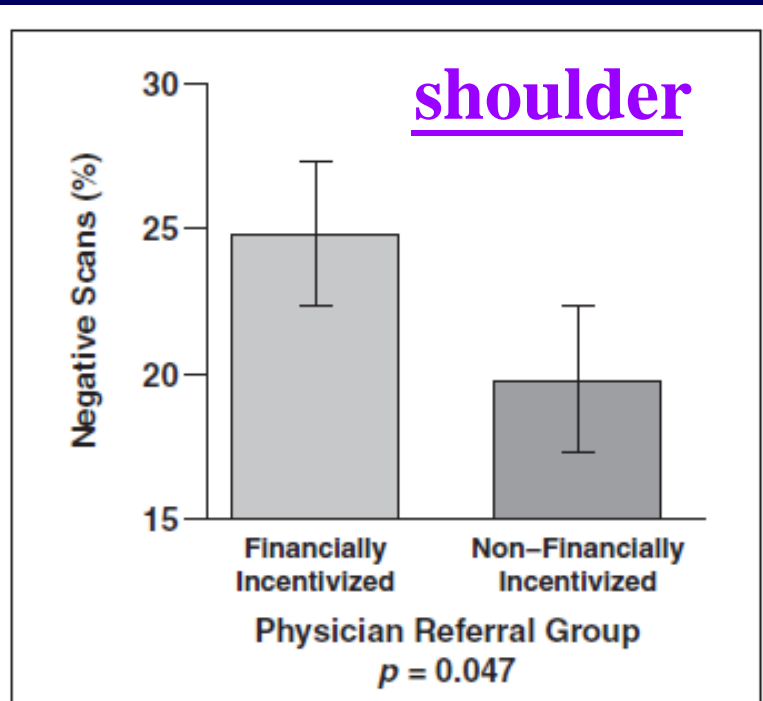


Fig. 1—Percentage of negative scans per physician group.

Knee MRI Study

--700 cases

-- 33% were negative from the financially incentivized office.

-- 25% were negative from the non-financially incentivized office

Lungren, Kilani et al, Radiology 2013;269:810

Amrhein, Kilani et al, AJR 2013;201:605

MedPAC Report to the Congress, June 2009

ETGs and imaging modalities selected for analysis

Episode Treatment Group	Primary imaging modalities
Cerebral vascular accident	MRI: brain, CT: head
Spinal trauma	MRI: other
Migraine headache	MRI: brain
Ischemic heart disease	Echocardiography, nuclear medicine
Congestive heart failure	Echocardiography, nuclear medicine
Valvular disorder	Echocardiography, nuclear medicine
Malignant neoplasm of pulmonary system	CT: other
Kidney stones	CT: other
Joint degeneration, localized—back	MRI: other, standard imaging
Joint degeneration, localized—neck	MRI: other, standard imaging
Joint derangement—knee and lower leg	MRI: other, standard imaging
Bursitis and tendonitis—shoulder	MRI: other, standard imaging
Other minor orthopedic disorders—back	MRI: other, standard imaging